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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,469	09/10/2003	Stephen R. Des Jardins	04813.0045.CPUS02	4952

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/660,469	DES JARDINS ET AL.	
	Examiner	Art Unit	
	Harry D. Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/1/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of group II (claims 32-45) in the reply filed on 21 February 2006 is acknowledged.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the term "dump valve" does not appear within the specification. However, it did appear in original claim 13. It is assumed that the claimed "dump valve" is referring to "outlet valve" 2232. Either the specification should be amended to include reference to the outlet valve 2232 being referred to as a dump valve or claim 51 should be amended to recite an outlet valve instead of a dump valve.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 32, 39, 48, 49, 54 and 55 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Uzoh et al (US 6,113,769).

Uzoh et al anticipate the invention as claimed. Uzoh et al teach (see figure 1 and col. 4, line 8 to col. 5, line 16) a method for maintaining a concentration range of an metal species during electrolysis (specifically electroplating) comprising containing in a first container (CHEM. A) a first body of a solution including the dissolved metal, maintaining second body of the solution in a second container (PLATING RESERVOIR TANK) in fluid communication with the first container, the dissolved metal in the second body having a concentration, circulating the second body through an electrolyzer (plating cell, see col. 5, lines 37-41), electrolyzing a portion of the dissolved metal of the second body in the electrolyzer (plating a substrate), sensing the concentration of the metal in solution using sensors 31 and exchanging solution between the first and second containers responsive to the sensed concentration.

Regarding claim 39, when the concentration of the metal was within an acceptable range, the solution was circulated to the electrolyzer, and if the concentration was not acceptable, the valves were opened so that the baseline solution could be added so that it was circulated through the electrolyzer.

Regarding claims 48 and 49, one of ordinary skill in the art would have immediately envisaged using a pump to provide the motive force to move the solutions between the first and second containers. Since the flow was from the first to the second container, the flow would go from an inlet at the first container, to the pump and then to an outlet at the second container.

Regarding claim 54, Uzoh et al teach (see col. 3, lines 44-47) using zinc as the dissolved metal.

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Regarding claim 55, the solution of Uzoh et al was aqueous.

5. Claims 32, 39, 48, 49 and 55 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Andricacos et al (US 5,352,350).

Andricacos et al anticipate the invention as claimed. Andricacos et al teach (see figure 2) a method for maintaining a concentration range of a metal species during electrolysis (specifically electroplating) comprising containing in a first container (IRON) a first body of a solution including the dissolved metal, maintaining second body of the solution in a second container (MIX TANK) in fluid communication with the first container, the dissolved metal in the second body having a concentration, circulating the second body through an electrolyzer (PLATING CELL), electrolyzing a portion of the dissolved metal of the second body in the electrolyzer (electroplating a substrate), sensing the concentration of the metal in the second body (using RDE Fe^{2+} MONITOR) and exchanging solution between the first and second containers responsive to the sensed concentration.

Regarding claim 39, when the concentration of the metal was within an acceptable range, the solution was circulated to the electrolyzer, and if the concentration was not acceptable, the valves were opened so that the baseline solution could be added so that it was circulated through the electrolyzer.

Regarding claims 48 and 49, one of ordinary skill in the art would have immediately envisaged using a pump to provide the motive force to move the solutions between the first and second containers. Since the flow was from the first to the second

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container, the flow would go from an inlet at the first container, to the pump and then to an outlet at the second container.

Regarding claim 55, the solution of Andricacos et al was aqueous.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 33-38, 40-47, 50-51 and 57-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh et al (US 6,113,769).

Regarding claims 33 and 40, Uzoh et al teach (see col 4, lines 26-33) that the sensors 31 may also include temperature sensors.

However, Uzoh et al do not expressly teach controlling the temperature of the second body of the solution.

One of ordinary skill in the art would have found it obvious to have maintained the temperature of the second body within a predetermined range because Uzoh et al suggest using the sensors to measure temperature and because the temperature of the solution would have affected the electroplating process by adjusting the electroplating rate. Therefore, it would have been obvious to have controlled the temperature of the solution in order to obtain more accurate control of the electroplating process.

Regarding claims 34-35 and 41-42, it would have been within the expected skill of a routineer in the art in to have optimized the desired temperature of the solution to obtain optimal electroplating results.

Regarding claims 36-38 and 43-45, it would have been obvious to one of ordinary skill in the art to have maintained the temperature by providing the appropriate heating or cooling as necessary to maintain the temperature at a constant value. Since the temperature of solution in the storage tank (first body of solution) would not have been affected by the electroplating process, one of ordinary skill in the art would have used it to help control the temperature since it could have been maintained at the desired temperature and then fed to adjust the temperature of the second body of solution.

Regarding claims 46-47, one of ordinary skill in the art would have found it obvious to have utilized conventional heating/cooling/pumping equipment for affecting the desired temperature control.

Regarding claim 50, it would have been obvious to one of ordinary skill in the art to have utilized a tempering valve to provide the mixing of the first body of solution with the second body of solution by using the recirculating pump (53) of Uzoh et al to additionally pump the first body of solution into the second body of the solution. The three-way tempering valve would have been used so that the second body of solution was continuously recirculated, and the opening condition of the valve controlled the rate of addition of the first body of solution.

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Regarding claim 51, it would have been obvious to one of ordinary skill in the art to have utilized an outlet valve to provide for the removal of the second body of solution to the first body of solution because when the solution in the second body reached too low of a concentration it would have needed to be totally replaced.

Regarding claims 57 and 58, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the metal because the metal concentration affected the rate at which the electroplating occurred.

Regarding claim 59, Uzoh et al do not expressly teach sensing the concentration of the metal in the first body. However, one of ordinary skill in the art would have found it obvious to have sensed the concentration of the metal in the first body to ensure that the concentration does not change.

8. Claims 52-54 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh et al (US 6,113,769) in view of Siu et al (US 5,958,210).

Uzoh et al do not teach the electrowinning of zinc from zinc oxide.

Siu et al teach the electrowinning of zinc in a cell by electrolyzing a solution of zinc oxide.

Therefore, it would have been obvious to one of ordinary skill in the art to have utilized the concentration control mechanism disclosed by Uzoh et al to control the concentration of zinc in solution in the process of Siu et al in order to maintain a consistent zinc concentration to enable more even electrowinning.

9. Claims 51 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh et al (US 6,113,769) in view of Talasek et al (US 2004/0108213).

Uzoh et al do not teach (1) returning the solution from the second body to the first body and (2) sensing the concentration of the first body.

Talasek et al teach interposing a buffer reservoir (equivalent to the second body) in an electroplating system for the purpose of ensuring that the electrolyte is well mixed and the depletion of the metal species in the relatively small electrolyzer (plating cell) is counter acted by continuous circulation between the buffer reservoir and the plating cell. The plating solution is additionally continuously recirculated between the first and second bodies.

Therefore, it would have been obvious to one of ordinary skill in the art to have utilized a buffer reservoir as taught by Talasek et al for the additional advantage of counteracting the depletion of the metal species in the relatively small plating cell by continuously circulating the plating solution.

Since the plating solution would have been continuously circulating between the first and second bodies, one of ordinary skill in the art would have been motivated to have (1) added a means for returning the solution of the second body to the first body, such as an outlet valve and (2) to have monitored the concentration of the metal species in the first body in addition to in the second body to ensure that the proper concentration of the metal species was maintained.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Examiner
Art Unit 1742

hdw